

REMARKS

Claims 1-16 are now pending in the application. Claims 1-4, 7 and 9-14 have been amended and claims 15 and 16 have been added. Claims 1 and 7 are independent. Reconsideration of this application, as amended, is respectfully requested.

Rejection Under 35 U.S.C. § 112

Claims 11 and 12 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. This rejection is respectfully traversed.

As the Examiner will note, claims 11 and 12 have been amended to depend from claims 8 and 9, respectively. Accordingly, there is now proper antecedent basis for the recitation "the motorcycle helmet" in these claims.

In view of the above amendments and remarks, Applicants respectfully submit that claims 11 and 12 are definite and clear. Accordingly, reconsideration and withdrawal of the rejection under 35 U.S.C. § 112, second paragraph, are respectfully requested.

Rejection Under 35 U.S.C. § 103

Claims 1-7, 11 and 12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Park et al., U.S. Patent No. 5,309,519. Claims 7-10, 13 and 14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Szilagyi et al., U.S. Patent No. 5,736,808. These rejections are respectfully traversed.

The present invention is directed to a piezo-film speaker and a motorcycle helmet incorporating a piezo-film speaker therein. Independent claims 1 and 7 of the present invention require a combination of elements including "a flat piezo-film curvedly supported to form at least one curved portion ... having at least a radius (R) of curvature at each curved portion in a range of $R \geq 200$ mm or an area (S) of a principal surface of said piezo-film is in a range of $S \geq 40 \text{ cm}^2$."

With the above construction according to the present invention, it is possible to reproduce sound at a sound pressure, which is sufficiently audible, even when riding a motorcycle. In addition, it is possible to provide voice/sound reproduction at a sound pressure having a high tone quality and adequate volume. Applicant respectfully submits that the references relied on by the Examiner are insufficient to teach or suggest the above aspects of the present invention and are therefore incapable of accomplishing the above advantages of the present invention.

The Examiner relies on the Park et al. and Szilagyi et al. references in order to render the presently claimed invention obvious. Applicant respectfully submits that neither of these references are sufficient to suggest the presently claimed invention. Specifically, the Park et al. and SZilagyi et al. references disclose a piezo-film having some extent of curvature; however, the curvature is clearly not as substantial as the 200 mm curvature of the present invention.

However, as explained by the present inventor in the disclosure of the present invention, in piezo-film, the quality of acoustic output is dependent on the radius of curvature of a curved portion of the piezo-film and the surface of the curved portion. The possible combinations of radius of curvature and surface of a curved portion of a piezo-film is very large (almost infinite).

In view of this, it is very difficult to determine the appropriate combination of radius of curvature and surface of a curved portion of a piezo-film to obtain the most advantageous results. It is the present inventors that have determined the most appropriate combination in order to obtain a high quality of acoustic output. Applicant respectfully submits that there is absolutely no teaching in the references relied on by the Examiner of the radius of curvature and surface of a curved portion of a piezo-film. In view of this, the Examiner's rejection is improper and should be withdrawn.

The Examiner recognizes that the Park et al. and Szilagyi et al. references fail to teach the radius of curvature and surface of a curved portion of a piezo-film. However, the Examiner has taken the position that it would be obvious to modify the Park et al. and Szilagyi et al. references to arrive at the presently claimed invention. Applicant respectfully submits that the Examiner has not established a *prima facie* case of obviousness. For example, with regard to claim 1, the Examiner states the following:

Since Park et al. do utilize the flat piezo-film in many applications and do not restrict to any specific configurations for the film, it therefore would have been obvious to one skilled in the art at the time the invention was made to provide a flat piezo-film with desirable configurations, such as a slightly curved configuration (with a rather large radius and sufficient active surface area), for any suitable supporting structure, in order to generate desirable sound.

Applicant respectfully submit that the above is insufficient to establish a *prima facie* case of obviousness. As the Examiner will note, MPEP § 2142, third paragraph (August 2001) states the following:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations."

Applicants respectfully submit that the Examiner has failed to meet his burden in establishing a *prima facie* case of obviousness since the Examiner has not provided any suggestion or motivation to modify the combination of references relied on. The Examiner must first establish a *prima facie* case of obviousness before the burden shifts to the Applicants to rebut the *prima facie* case. The Examiner is shifting the burden to Applicants to prove non-obviousness without first establishing obviousness.

Referring to paragraph 4 of MPEP § 2142, the Examiner is placed with the initial burden "to provide some suggestion of the desirability of doing what the inventor has done." The Examiner must show that the references expressly or impliedly suggest the claimed invention or a convincing line of reasoning should be set forth as to why the modification is obvious. The Examiner has provided no suggestion or convincing line of reasoning in the present case. Accordingly, the Examiner's burden has not been satisfied.

The only rationale provided by the Examiner is a statement that the modification would be obvious, since the references are not restricted to any specific configuration for the film. Applicant respectfully submits that this is not establishing a *prima facie* case of obviousness. In addition, the Examiner is attempting to avoid establishing a *prima facie* case of obviousness by shifting the burden to Applicant to prove non-obviousness without providing any teaching or

suggestion to modify the references. As noted above, there must be some suggestion to modify a reference in order to establish a *prima facie* case of obviousness. The Examiner has set forth no suggestion for the modifications and therefore the rejection should be withdrawn. It is respectfully requested that the Examiner provide some suggestion for modifying the combination of references to select the specific radius of curvature or the specific surface of the curved portion of the piezo-film. Since the references are silent with regard to such a suggestion, it is requested that the Examiner withdraw the rejection.

Furthermore, it appears that the Examiner has taken the position that it would only require routine experimentation to arrive at the present invention. However, the Examiner has not demonstrated that the radius of curvature and surface of a curved portion of a piezo-film is a result-effective variable with regard to sound quality. A particular parameter must first be recognized as a result-effective variable, a variable that achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). Since the Examiner has not shown that the prior art recognizes the relationship between radius of curvature and surface of a curved portion of a piezo-film, Applicant submits that there is insufficient teaching to optimize the radius of curvature and surface. It is applicants that have demonstrated that the radius of curvature and the surface of a curved portion of a piezo-film increases acoustic performance, not the references relied on by the Examiner or other prior art.

Further to this, Applicant respectfully submits that the Examiner has not provided any indication that the prior art was aware that the radius of curvature or surface of a curved portion

of a piezo-film has anything to do with sound quality. This awareness was determined by Applicant. Applicant submits that this treatment by the Examiner is improper. "If there is no evidence that a person of ordinary skill in the art at the time of applicants' invention would have expected problem to exist at all, it is not proper to conclude that invention which solves this problem, which is claimed as an improvement of prior art device, would have been obvious to that hypothetical person." *In re Nomiya*, 184 U.S.P.Q. 607, 608 (CCPA 1975)(emphasis added). In the present case, neither the Park et al. or Szilagyi et al. references recognize that the radius of curvature and surface of a curved portion of a piezo-film is important to sound quality. This awareness appears only in Applicant's own disclosure. "There must be a reason apparent at time invention was made to person of ordinary skill in the art for applying the teaching at hand, or use of teaching as evidence of obviousness will entail prohibited hindsight." *Id.* at 608. This is exactly what the Examiner is doing in the present case. The Examiner has not provided any evidence of the awareness of a problem in the prior art and therefore one having ordinary skill in the art would not recognize to look for a solution. Accordingly, the Examiner is conducting prohibited hindsight.

It should also be pointed out that "a patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified. This is part of the 'subject matter as a whole' which should always be considered in determining the obviousness of an invention under 35 U.S.C. § 103" *In re Sponnoble*, 405 F.2d 578, 585, 160 U.S.P.Q. 237, 243 (CCPA 1969). Accordingly, the Examiner must provide evidence that one having ordinary skill in the art was aware of a problem before the Examiner

can modify a prior art reference to arrive at the present invention. Since the Examiner has not provided evidence of an art recognized problem, the Examiner's rejection is improper and should be withdrawn.

In view of the above amendments and remarks, Applicant respectfully submits that claims 1-14 clearly define the present invention over the references relied on by the Examiner. Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 103 are respectfully requested.

Additional Claims

Additional claims 15 and 16 have been added for the Examiner's consideration. Applicant respectfully submits that these claims are allowable due to their dependence upon allowable independent claims 1 and 7, as well as due to the additional limitations recited by these claims.

Favorable consideration and allowance of additional claims 15 and 16 are respectfully requested.

Allowable Subject Matter

As mentioned above, independent claims 1 and 7 are allowable over the prior art relied on by the Examiner. In addition, the dependent claims are allowable due to their dependence upon the independent claims, as well as due to the additional limitations recited by these claims. Accordingly, all of the claims in the present application should be in condition for allowance.

Favorable consideration and allowance of the above-identified application is therefore respectfully requested.

CONCLUSION

Since the remaining references relied on by the Examiner have not been utilized to reject the claims, but merely to show the state of the art, no further comments are deemed necessary with respect thereto.

All the stated grounds of rejection have been properly traversed and/or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider all presently pending rejections and that they be withdrawn.

It is believed that a full and complete response has been made to the Office Action, and that as such, the Examiner is respectfully requested to send the application to Issue.

Attached hereto is a marked-up version of the changes made to the application by this Amendment.

In the event there are any matters remaining in this application, the Examiner is invited to contact Paul C. Lewis (Reg. No. 43, 368) at (703) 205-8000 in the Washington, D.C. area.

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If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

Very truly yours,

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Attachment: Version with Markings to Show Changes Made

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

The claims have been amended as follows:

1. (Amended) A piezo-film speaker comprising:

a flat piezo-film curvedly supported to form at least one curved portion, said flat piezo-film having at least a radius (R) of curvature at each curved portion [is] in a range of $R \geq 200$ mm or an area (S) of a principal surface of said piezo-film is in a range of $S \geq 40 \text{ cm}^2$.

2. (Amended) The piezo-film speaker according to claim 1, wherein said flat piezo-film includes the characteristics of a radius (R) of curvature at each curved portion [is] in a range of $210\text{mm} \leq R \leq 360 \text{ mm}$.

3. (Amended) The piezo-film speaker according to claim 1, wherein said flat piezo-film includes an area S of a principal surface of said piezo-film [is] in a range of $40 \text{ cm}^2 \leq S \leq 100 \text{ cm}^2$.

4. (Amended) The piezo-film speaker according to claim 1, wherein said flat piezo-film includes:

a radius (R) of curvature at each curved portion [is] in a range of $210\text{mm} \leq R \leq 360 \text{ mm}$ and an area (S) of a principal surface of said piezo-film is in a range of $40 \text{ cm}^2 \leq S \leq 100 \text{ cm}^2$.

7. (Amended) A motorcycle helmet including a hard, thin helmet shell, said helmet comprising:

a piezo-film speaker built into said helmet, wherein said piezo-film speaker includes a flat piezo-film curvedly supported to form at least one curved portion, said flat piezo-film having at least a radius (R) of curvature at each curved portion [is] in a range of $R \geq 200$ mm or an area (S) of a principal surface of said piezo-film is in a range of $S \geq 40$ cm².

9. (Amended) The motorcycle helmet according to claim 7, wherein said flat piezo-film has a radius (R) of curvature at each curved portion [is] in a range of $210\text{mm} \leq R \leq 360$ mm.

10. (Amended) The motorcycle helmet according to claim 7, wherein said flat piezo-film has an area S of a principal surface of said piezo-film [is] in a range of $40\text{ cm}^2 \leq S \leq 100\text{ cm}^2$.

11. (Amended) The motorcycle helmet according to claim [2] 8, wherein said piezo-film speaker has a film thickness (t) of $110\text{ }\mu\text{m}$.

12. (Amended) The motorcycle helmet according to claim [3] 9, wherein said piezo-film speaker has a film thickness (t) of $28\text{ }\mu\text{m}$.

13. (Amended) The motorcycle helmet according to claim 7, wherein said helmet further comprises:

a head liner fixed on an inner surface of said helmet shell;
a head inner removably and dividedly mounted so as to cover the head liner; and
ear inners and a chin inner removably and dividely mounted with respective liners on the
inner surface of said helmet shell[;].

14. (Amended) The motorcycle helmet according to claim 13, wherein said helmet
further comprises a plurality of said flat piezo-film speakers, each speaker mounted directly to
said inner surface of said helmet shell.

Claims 15 and 16 have been added.